

A Paradigm for the U.S. Army Transformation

**A Monograph
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ABSTRACT

Developing a paradigm for the U.S. Army Transformation. by Major Van R. Sikorsky, USA, 52 pages.

This monograph analyzes the Revolution in Military Affairs of early modern Europe to develop a paradigm for the current posited RMA and for the U.S. Army Transformation. Michael Roberts introduced the concept of a "military revolution" during a lecture presented at the Queen's University of Belfast in 1955. The lecture entitled "The Military Revolution 1560-1660", influenced numerous scholars and was the genesis of a large body of work on the subject. Exploitation of these works can potentially lead to a better understanding of military revolutions in general, the posited current military revolution and the U.S. Army Transformation. The militaries of early modern Europe passed through the crucible of transformation during the RMA of early modern Europe. The United States Army is currently undergoing a transformation as it incorporates digital technology into its arsenal. The United States Army is moving from its current force structure, known as the Legacy Force, to an Objective Force in which all divisions share a common design and possess similar C4ISR capabilities, logistical capabilities, and a common suite of vehicles. The paradigm developed in the monograph will determine whether there is an ongoing RMA and then whether that same paradigm is illustrative and appropriate for the U.S. Army Transformation.

First, the monograph establishes workable definitions for an RMA and a paradigm. The monograph then assesses the notable works of scholars who studied the RMA of early modern Europe. This assessment will establish a framework with which to evaluate that early RMA and will lay the groundwork for establishing a paradigm. The actual battlefield events which occurred during the RMA of early modern Europe are then analyzed and a five part paradigm developed. This paradigm is then compared to current circumstances and determines that there is currently an ongoing RMA.

The monograph then evaluates the current U.S. Army Transformation. Analysis of the component parts of the U.S. Army Transformation is necessary so that they can be clearly identifiable in preparation for comparison to the paradigm of early modern Europe. Once the component elements of the current Transformation are clearly articulated, they can then be compared to the paradigm of early modern Europe to see if that paradigm is illustrative and appropriate.

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Prologue

Adolphus Gustavus, "The Lion of the North", surveys his army, as it stands formed for combat in the crisp autumn air of 1631. The King of Sweden's Army is an amalgamation of mercenary troops from Scotland, Germany, Finland and Ireland along with a sturdy backbone of native Swedish troops composing a total force of 27,000 men. The flags of the Yellow, Blue and Green Regiments fly proudly over the King of Sweden's "colored" mercenary regiments while the native Swedish troops take the field clad in their blue and yellow uniforms. Drilled unceasingly in mobile tactics and organized into flexible formations the King's army is confident in this, their first clash with the Imperial army. In the first line of the King's center are four infantry regiments of interspersed musketeers and pikemen. Behind this forward line is a Scots infantry regiment and a reserve cavalry regiment. Behind these stout soldiers is a second line of three infantry regiments with two additional cavalry regiments positioned to the rear. On the Swedish right wing, Field Marshal Baner commands a front line of five cavalry regiments interspersed with musketeers and a cavalry regiment held in reserve. The King casts a wary eye to his left wing where 18,000 untested and possibly unreliable Saxon allies stand poised for combat. Across the field, the Imperial Army is an imposing sight, arrayed in battle formations under their black eagle banners and representing the finest of the "Old Model" armies. The Imperialist's have 30,000 infantry and 10,000 cavalry formed with pikemen and musketeers in the center and equal numbers of cavalry on either wing. Adolphus knows the enemy is a veteran force led by an able and so far undefeated commander, Tilly. Adolphus' army is more mobile and has better arms and artillery than

his opponents, yet he waits for Tilly to initiate contact, accepting the fact that the Imperial army on the defense is still an extremely formidable foe.

The Imperialist commander senses hesitancy and instigates an artillery duel with the Swedes. The Swedish artillery fires in return at almost three times the rate of the Imperialist artillery and soon is causing horrendous casualties among their massed formations. The Imperial cavalry, unable to passively withstand the uneven bombardment rashly charges the Swede's right wing. Seven times they charge forward and seven times they are repulsed by Swedish musketeers who pour intense fire into the packed cavalry ranks, emptying saddles by the hundreds. Field Marshal Baner realizing the time is ripe for a counter charge, orders his reserve cavalry forward. They attack with such violence that they drive the Imperialist wing entirely from the field in complete disarray. The King notes this success and turns his attention to his left wing. The Imperialist cavalry charges here also, and meets with astonishing success as the entire Saxon force quits the field in disorder. Tilly seeing this development sends his infantry forward to attack the Swede's exposed flank. Adolphus, anticipating this eventuality, calmly orders Field Marshal Horn and the Swedish reserve to wheel to the left. Horn moves with much greater speed than the statuesque maneuverings of the Imperialists and is in firing position first, pouring crushing musket and cannon volleys into Tilly's now vulnerable infantry. Adolphus, feeling the front becoming stabilized, gallops to his right and personally leads four regiments of cavalry against the Imperialist artillery. Riding through a hail of fire the King captures the Imperialist artillery batteries and soon has them turned on Tilly's congested and exposed troop formations. Caught in a savage crossfire the Imperialists suffer appalling casualties. The Swedish center launches a

*final charge, and the Imperialists flee the field leaving 7,000 dead as well as 6,000 wounded and captured soldiers behind. As the dust of battle clears, The Battle of Breitenfeld is over, Adolphus stands victorious, and a military revolution is consummated.*¹

Chapter I

Michael Roberts introduced the concept of a "military revolution" during a lecture presented at the Queen's University of Belfast in 1955. The lecture entitled "The Military Revolution 1560-1660", influenced numerous scholars and was the genesis of a large body of work on the subject. Exploitation of these works can potentially lead to a better understanding of military revolutions in general and the posited current military revolution in particular. However, the definition of a military revolution is open to debate among scholars and contemporary theorists. This difficulty in definitional issues has to be overcome in order to learn from and exploit the knowledge of the previous RMA. Michael Roberts never defined the term, with a precise definition; instead he assigned the military revolution certain characteristics. Noted military historian Clifford J. Rogers described a revolution as a rapid reversal in the state of affairs over a particular time period. Many current definitions of an RMA focus on the application of technological innovations to military organizations normally excluding social, political and economic factors.² The RMA is thus a discontinuous increase in military capability and effectiveness set apart from the normal evolutionary accrual of military capabilities. This monograph defines an RMA as a rapid and radical change in the character and conduct of warfare causally linked to technological, social, political and economic considerations. Whether the "considerations" come before the change in warfare or are a product of it,

and which "considerations" take primacy are issues to answer throughout the monograph. This in turn will greatly assist in answering the main question the monograph poses; does the Revolution in Military Affairs of early modern Europe (16th - 18th Centuries) provide an illustrative and appropriate paradigm for the current United States Army Transformation?

During the earlier RMA, the militaries of early modern Europe stood on the threshold of a new age, the age of industrialization and firearms. Although firearms were present in armies prior to the 16th Century, during this period they become a dominant force on the European battlefield. Subsequent developments and refinements during the 17th and 18th Centuries assured their continued dominance. Social, economic and political changes were also present during this period of sweeping military advancements. It is a source of great debate whether technological advances were the primary agent of change during the early RMA, or whether social, economic and political changes were more significant. Even the exact dates of the RMA of early modern Europe are indeterminate. Today, some say, humanity stands upon the similar threshold of a new age, the age of information and digitization. Computers and digital technology are maturing developments now advanced to the point that they can achieve ascendancy as the dominant force on the battlefield. Both firearms and digitization are unique technologies with each presenting very specific physical requirements, means of employment, psychological and conceptual requirements as well as social adjustments. Like the earlier RMA, the current military advancements could have attendant social, economic and political implications and possibly sources.

The militaries of early modern Europe passed through the crucible of transformation in a period known as the Revolution in Military Affairs. The United States Army is currently undergoing a transformation as it incorporates digital technology into its arsenal. The United States Army is moving from its current force structure, known as the Legacy Force, to an Objective Force in which all divisions share a common design and possess similar C4ISR capabilities, logistical capabilities, and a common suite of vehicles. A milestone to be met along this transformation path is the Interim Force. Initially consisting of two brigades, the Interim Force will validate the operational capabilities and share the same overall characteristics of the Objective Force.³ The U.S. Army Transformation is not an RMA, but attempts to leverage and exploit the RMA. A critical question arises as to whether the application of digital technology will drive this Transformation and the RMA in general, or whether the apparent RMA is a function of larger social, political and economic developments. Also critical to the current U.S. Army Transformation is whether it is able to not only exploit, but also control the direction of current militarily significant advances.

The concept of a *paradigm* is indispensable as similarities become apparent between the RMA of Early modern Europe and the factors leading to and impacting on the current U.S. Army Transformation. Thomas S. Kuhn's work, *The Structure of Scientific Revolutions* is able to make use of *paradigm* by developing the word beyond a definition and into a holistic conceptual framework. A *paradigm* is a data set, of a particular phenomenon, which when extrapolated and applied to a like phenomenon provides a model for common understanding and exploitation. The phenomenon in this case is the RMA.⁴

The derivation of a *paradigm* from historical precedent is possible. However, it is not possible to scientifically dissect the historical period and develop a theorem that is applicable in all instances. There were numerous unique factors at work during the RMA of early modern Europe that will never be precisely replicated again. However, it should be possible to either glean an appropriate *paradigm* for the current U.S. Army Transformation based on the study of the first RMA or to determine that current conditions entail a *paradigm shift* and a new set of circumstances unique in history. If able to develop convincing similarities, the resultant *paradigm* could then help guide and predict the success of the current U.S. Army Transformation.

Chapter II

This chapter examines the theories of the most prominent scholars and historians who wrote about the RMA of early modern Europe. Scholars who study the early RMA usually differ in two major areas, namely in the determination of the dates of the RMA and the proximate causes of the RMA. The Sixteenth Century is the focal point, with some scholars extending the dates on either side, sometimes up to hundreds of years. This period, given the approximation in exact dates, separated the medieval world from the modern. The assessors of primary causes fall into three camps, those who believe social, economic or political considerations take primacy, those who think the RMA's primary cause was technology, and those who believe that a combination of technological and non-technological factors were the primary causes. Social, economic and political causes include military tactics, organization, centralized state formation, availability and collection of monetary resources, manpower availability and requirements as well as a host of other considerations of a non-technical genre. This section will examine the most

noted scholars theories and analyze battlefield examples in an effort to determine the proximate cause or causes of the RMA. The determination of causality will establish the principle parameters within which to judge the RMA of early modern Europe to possibly develop a resultant *paradigm*, or ascertain a *paradigm shift* when compared to the current RMA.

The Non-Technologists

The most prominent proponent of the non-technologist point of view is Michael Roberts. Although Roberts gives credit to the technological influences on the military revolution, he states that the search for improved tactics was the major agent of change.⁵ "The military revolution which fills the century between 1560 and 1660 was in essence the result of just one more attempt to solve the perennial problem of tactics - the problem of how to combine missile weapons with close action; how to unite hitting power, mobility, and defensive strength."⁶ Thus, even though a non-technologist gives recognition to the impact of technology on the RMA, the prevalent belief is that the primary cause of the RMA is non-technological. This then is the dividing line between the non-technologist and the technologist.

For Roberts the development of improved tactics and doctrine drove the RMA and fueled subsequent changes in the social, political and economic life of early modern Europe. Maurice of Orange and Gustavus Adolphus developed the doctrine encompassing and utilizing linear tactics, which revolutionized warfare. Borrowing from early Roman tactics these Great Captains, developed flexible formations which best employed the emerging technology of firepower in combination with the tried and true shock of the pike. The new tactics required more disciplined soldiers who would

subordinate themselves to the good of the military formation in which they were fighting. The weaponry and training required of the individual precluded disbanding military formations after a conflict due to the cost involved in development and maintenance. Roberts then combined these facts with the unique circumstances occurring as a result of the Thirty Years' War. The numerous belligerents participating in the Thirty Years' War required military operations over several extended fronts simultaneously. This in turn led to an increase in the size of armies in order to fight along these various fronts.⁷

Governments became centralized and authoritarian to build and maintain these large military machines, creating in the process large bureaucracies to collect and manage revenues.⁸ Social conditions also changed as the peasantry now formed the nucleus of the various armies causing a breakdown of class stratification in society. Peasants were able to rise through the ranks in the military, and in essence could achieve nobility on the battlefield. Conversely, many noble left military service in order to serve king and country in other capacities. Economic changes were also prevalent as states attempted to control vital war making resources through their mercantile communities. The merchants were happy to support the state for a profit, and the state in turn was obliged to protect markets and resources to remain economically healthy.

Other non-technologists postulate different and varied proximate causes for the RMA of early modern Europe including the growing wealth of European states, the growing European population, military logistics and the political environment. John Lynn is a noted historian who believed that the burgeoning wealth and population of Europe were the key factors behind the development of the armed forces of the 16th and 17th centuries. These massive armed forces were the largest institutions maintained by

European states and they fueled the military revolution. He closely examined the size and expansion of the French Army during the periods before and after 1659 under the auspices of Richelieu and Louis XIV respectively. Lynn concluded that before 1659 the French army expanded during wartime and then contracted somewhat at the conclusion of hostilities, but that after 1659 the size of the French army literally exploded. Although still contracting at the end of hostilities the peacetime army after 1659 was still over 650% larger than previous peacetime forces. This shift towards a professional standing army meant that the state was now responsible for recruiting, arming, equipping, feeding and housing substantial numbers of soldiers even during peace. This increase came about because the population could now support prodigious numbers of peacetime soldiers and the state had the wealth to maintain them. Thus for Lynn the social and economic factors were the proximate causes for the RMA and meant that large standing armies were here to stay.⁹

David A. Parrott in his article, "Strategy and Tactics in the Thirty Years' War: The 'Military Revolution'", argues that both politics and logistics fueled the RMA of early modern Europe. Parrott hypothesizes that military forces developed during this time period were almost impossible to defeat on the battlefield with other symmetrical forces. Utilizing the emerging technology of firepower with the proven strength of the pike formation and the martial 'will' found in these elite formations the professional armies of the period were devastatingly effective¹⁰ Thus combat wasn't the only use for the militaries of the day.

States maintained large armies to coerce peoples and countries into complying with their political aims and not necessarily nor primarily for combat. Deterrence of outside

forces and maintenance of order within the state were the primary reasons to maintain large armed forces. These were the political imperatives. However, the logistical imperatives of the day put constraints on the increasing size of armies. Large forces, concentrated for battle would potentially outstrip the state's ability to maintain them. These masses of men would require forage for sustenance, and naturally, a state would not want that to occur on its own territory. Strategic thought was geared towards, and hampered by, the need to attack territory that could maintain these large forces and protected one's own land in turn. The political advantage and necessity of maintaining large armies was tempered by logistical considerations, which in turn drove strategy.¹¹ For both Lynn and Parrott the large forces of the time period were evidence of a revolution and were made possible primarily by social, political and economic factors.

The Technologists

The most noted advocate of technology as the primary agent of change that led to the RMA was Geoffrey Parker. Parker saw the tactical innovations of Maurice and Gustavus Adolphus as evolutions springing from earlier sources and not revolutionary in their own right.¹² For Parker, it was the technological innovation of the *trace italienne* or artillery fortress that was the proximate cause for the RMA. Advances in artillery rendered medieval fortresses vulnerable to destruction from long range. The medieval walls were tall, designed to make infantry assault difficult; the higher the wall the harder it was to successfully negotiate and the less vulnerable the defender. Artillery exploited this vertical construction by battering down the high, and relatively thin walls from extended ranges. To counteract this deficiency military architects began building fortresses with low, thick walls designed to withstand the most ferocious bombardments

of the day. The extended range of artillery increased the distance from which construction of siege works could begin in safety. This necessitated a large covering force and large siege force to cover the extended area, which in turn contributed significantly to the increased size of armies. Of course large manpower pools had to be readily available to fill these needs, governments had to be capable of organizing and controlling large armies, technological improvements in supply means such as roads and means of transport needed to be present, and the state needed the wealth to accomplish all this. During the sixteenth century, all of these variables were present.¹³

David Eltis, in his book *The Military Revolution in Sixteenth-Century Europe* agreed with Roberts that technology was the proximate cause for the RMA, although he disagreed with the assertion that it was the *trace italienne*. Eltis believes that firearms and artillery technology were the proximate causes for the RMA. He agrees that the *trace italienne* and siege tactics advanced the RMA and that the combinations of pike and shot into articulated formations was revolutionary, however the proximate cause for him was firearms. "Firearms, hitherto ineffective, underwent improvements and emerged as the dominant force on the battlefield and in siege warfare."¹⁴

The Pluralists

Somewhere between the dichotomies of the technologist and the non-technologist, lays the pluralist view that combinations of forces were at work. These theorists believed technological and non-technological advances, equally or near equally, fueled the RMA of early modern Europe. Clifford J. Rogers in his seminal work, *The Military Revolutions of the Hundred Years War*, not only extended the dates of the RMA of early modern Europe, but also argued that there were numerous revolutions at work. The

"Infantry Revolution" the "Artillery Revolution", the "Artillery Fortress Revolution", and the revolution in administration or what Roberts called the "Military Revolution", all combined to create the RMA. Rogers postulated that the biological concept of "punctuated equilibrium evolution" applies historically and is a paradigm for the advancements and ascendancy of the military in society. This paradigm entails a revolutionary change, such as the "Artillery Revolution", followed by incremental changes and a period of evolution, followed by another revolutionary change.

Emerging Battlefield Articulation

Given the numerous and varied theories on the primary causes of the RMA of early modern Europe it is now prudent to more closely examine the historical events, which led to these theories, in an attempt to verify which variables were present during the RMA and whether it is indeed possible to isolate the primary cause or causes. Since there is such a wide variation among the historian's analysis of the RMA, the possibility exists that a particular and definable set of circumstances were present, but the primary agent of change is indeterminate. The monograph will examine the major military powers of the era beginning with the ascendancy of the Swiss, their replacement by the Spanish *tercios*, and finally examining the successful and flexible Swedish formations. This examination will assist in the derivation of a paradigm for the RMA of early modern Europe. Without examining the historical events and forces, the paradigm would be incomplete.

During their wars for independence, the Swiss established themselves as the premier land force in Europe. Swiss tactics underwent considerable change and transformation during centuries of incessant warfare with the Austrians. The first staff weapon that the Swiss employed en masse was the halberd, which remained their principle weapon until

the Battle of Sempach in 1386. After narrowly escaping destruction at Sempach the Swiss Diet ordered the Canton's to increase the proportions of pikemen in their formations. This decision led directly to the ascendancy and supremacy of the Swiss model military.

The 18 foot pike was unwieldy and almost useless when used by the individual soldier, but was extremely effective when used en mass.¹⁵ This hedgerow of steel became semi-articulated with the introduction of the handgun and crossbow in the middle of the 15th century. Hand gunners and crossbowmen usually took positions to the front and rear of the Swill formations, which were themselves habitually arrayed into three columns. After firing initial salvos designed to disrupt and attrit enemy formations, the hand gunners and crossbowmen would fall back through the phalanx and continue to fire from the inside, flanks and rear of the formation. The difficulty in articulating handguns and pike lies in the technological status of the firearms. The two types of firearms developed during this period were the hand culverin and the hackbutt or hook-gun. "Early handguns were held under the arm and fired by lighting the touch hole with the glowing tip of a match".¹⁶ The hookgun was a heavy and cumbersome weapon that required a crew of two to load and fire. Its name is derived from the metal protrusion below the barrel, which reduced recoil when hooked over fortress walls or over a wooden firing support. It could take up to 15 minutes to reload these unwieldy weapons, making their integration into pike formations problematic. It is hard to understand why the slow firing and cumbersome firearms ever became staples in the armies of early modern Europe. The reasons were twofold. First firearms were the only weapons that could pierce plate armor on a consistent basis. The longbow and crossbow could do this at

close range, and given the proper angle, but firearms could do it easily every time.

Secondly, there was the psychological effect of firearms. The noise and smoke when fired in salvo, combined with the effect of dead and wounded in the ranks receiving fire was overpowering.¹⁷

The Swiss were not content with mastering defensive formations and developed the pike formation into a weapon, which could also take the offense. At first glance, it is hard to imagine how massed formations of pikemen, supported by slow firing weapons could maneuver on the battlefield. A closer look at Swiss formations reveals their considerable flexibility. The Swiss usually formed for battle with three columns in echelon. The lead column would strike the enemy formation at a predetermined point, with the center and rear columns free to envelop or exploit weakness in the enemy line. If the center attempted an envelopment and ran into trouble, the rear column would come to its assistance, or could conduct the envelopment itself. This echelonment of columns allowed the force to maintain momentum once engaged as one after another column slammed into the enemy. Such formations could expand or contract as terrain and enemy formations dictated.¹⁸ During their heyday, after the convincing victories of the Burgundian Wars, the Swiss columns were flexible and maneuverable.¹⁹ Numerous European forces attempted to replicate the Swiss method of combat through the formation of their own pikemen. The best and most noted replication was probably the German Landsknechts. These formations eventually became stagnant until better-articulated formations rendered them almost useless during the Italian Wars 1495-1525.²⁰

The Spanish fielded the next force to achieve unmatched dominance on the European battlefield. Although still employing the pike, their primary means of destroying the

enemy was the use of firepower. Handguns and artillery were much improved over what was employed during the Burgundian Wars and the Swiss felt their sting as Spanish and Swiss collided during the Battle of Bicocca (1522) and the Battle of Pavia (1525). The Battle of Bicocca was the last large-scale use of Swiss pike formations. The Spanish dug in behind a sunken road and devastated the Swiss formations with fire, "-the best storm-troops in the world had failed before the arquebus".²¹ The Spanish favored a combination of pike and shot, articulating their formations to a degree not seen before. "During the decade preceding Pavia the Spanish army had made a name for itself as the leading advocate of infantry firepower, and the proportion of arquebusiers to other troops was far greater than in Swiss or German units."²² At Pavia, the Spanish arquebusiers, defended by their own pikemen, first decimated the Swiss pike ranks and then the French knights. Although the Swiss at Pavia were of lesser quality than their predecessors and were also lacking their habitual arquebusier support, it was the Spanish and their firepower centric tactics that changed the face of European warfare. After these convincing victories, the Spanish, utilizing firepower and the type formations that availed them the ability to employ it, were now the dominant European land force.²³

The Spanish organized themselves into the effective and deadly *tercio*. This formation originally consisted of pikemen as the primary force along with halberdiers and sword-and-buckler infantry along the flanks. Later formations consisted solely of pikemen and arquebusiers organized for battle in a square of over 3,000 men; later reorganized into formations of 1,500 men.²⁴ The Sword-and-buckler infantry and halberdiers, which were used to protect Spanish flanks and attack enemy flanks, were done away with in an attempt to increase firepower by adding more hand gunners to formations. The *tercios*

boasted formations with 2/3 of the force composed of pikemen and 1/3 of hand gunners. For the first, time the pikemen now supported the hand gunners and not the other way around, as in the Swiss columns. As with the replication of the Swiss pike column, other nations replicated the Spanish *tercio*, and fielded formations similar to the Spanish model.²⁵ Military innovators had to deal with this highly effective formation as their primary threat.

Maurice of Nassau became the captain general of the army of the United Netherlands in 1589. Drawing heavily upon Roman historical influences, he introduced rigorous drill, flexible organization, scientific engineering and the employment of artillery concentrations to the Dutch forces. As the Dutch fought the Spanish, Maurice came to terms with the devastatingly effective Spanish infantry and developed counters to their tactics. To combat the Spanish *tercio* Maurice lengthened his linear formations, reduced the size of companies and correspondingly regiments and employed equal numbers of pikemen and musketeers. He would employ larger numbers of smaller units to increase his flexibility and maneuverability over the large and at times unwieldy *tercio*. The musketeers would fire in successive ranks, from the flanks of the pike formations, and file to the rear to reload. Although Maurice introduced many innovations in field forces, he is primarily known for his abilities at siege-craft. Most of his battles were sieges with two notable exceptions Tournhout in 1597, his first open field victory over the Spanish, and Nieuport in 1600, his greatest victory.²⁶

Although Maurice was effective in battle against the Spanish, it must be noted that most of the Spanish forces during this period were tied down along the French border, and that most of the forces that were in the Netherlands were in fortress garrisons.

Maurice did not herald the end of the Spanish *tercio*, but his innovations paved the way toward their destruction.

The formations of the Spanish *tercio* and the Swedes of Gustav Adolph met during the Battle of Brietenfield in 1631. "Because the Spanish military system was universally copied by the European powers, it was the Spanish type of army that Gustavus was called upon to meet."²⁷

Gustavus Adolphus further "opened" the formations of his army, creating a force that was highly maneuverable. Although still mixing pikemen and musketeers he reduced the depths of their ranks from 10 to three, creating a vastly more flexible force than the Spanish *tercios*. Technical innovations in handguns and artillery aided him during his force transformation and development. The wheel-lock replaced the heavy matchlock, paper cartridges with combined ball and powder increased rates of fire, pikemen utilized a shorter pike, and the "leather-gun" - a light and maneuverable four-pound cannon was introduced, and his cavalry was taught to charge with the saber to increase shock. Gustav Adolphus also reformed his cavalry, forcing them to attack with the saber for shock effect, rather than attacking with inaccurate, and many times ineffective, pistols. The combination of increased maneuverability and firepower proved too much for the Imperialist army under Tilly. Although an able and experienced commander, Tilly was using formations that were no match for the maneuverable Swedes. As previously noted in the prologue, during the critical point in the battle, Tilly uncovered the flank of Adolph's army and ordered his infantry forward. "Moving with much greater speed than the ponderous Imperialists could manage the Swedish reserve under Horn wheeled to the left and welcomed Tilly's infantry with shattering volleys from their musketeers and light

regimental cannons."²⁸ Gustavus would defeat Tilly a second time at Lutzen, but the Spanish Army would avenge themselves against the Swedes in 1634 at Nordlingen and thus the *tercios* continued to remain a formidable force.²⁹

There was a progression from the massed pike formations supported by hand gunners, to massed hand gunners supported by pikes, to flexible and smaller formations of equal numbers of pikes and hand gunners. There was also a well-established military battlefield hierarchy emerging where one method of combat achieves ascendancy for a time and was eventually supplanted by the next dominant form of combat. Each successive method of combat was copied by other nations until another method was developed to replace it. These ever more articulated combinations became increasingly more effective and deadly. Pikes and firearms needed each other on the battlefield. Pikes needed the arquebusiers to provide the fire to destroy armored knights, rip holes in enemy pike formations and to provide protective fires against enemy arquebusiers. Arquebusiers and musketeers likewise relied on the pikes for protection. Arquebusiers in the open, with their slow loading weapons, were quickly overrun by cavalry and enemy pike formations and thus needed their own pikes to protect them. "Thus, though some might extol the 'puissant pike' more than the arquebus or musket or vice versa, all came to recognize that it was only in the careful combination of the two that victory was to be obtained. A new system of infantry tactics had arisen".³⁰

Precursors

From this study of the RMA of early modern Europe, several conclusions are clear concerning the military revolution. First, numerous economic, social, and political factors contributed to the revolution. Secondly, there is no agreement on which factor

takes primacy. These technological, social, economic and political aspects of the RMA of early modern Europe are thus clearly precursors. They all contributed to the RMA and were necessarily present, but whether they drove or pushed the RMA and which was the primary agent of change is indeterminate.

Social aspects of the RMA include manpower availability and requirements as well as class iconoclasm. The growing populations of the day supported the growing militaries and the RMA helped bring down the social barriers between the aristocracy and peasantry. The peasantry could climb social ladders through military service and the state relied on their service.

Economically, not only did states need to possess the wherewithal to maintain militaries, but their strategies became inextricably intertwined with economics. They needed to secure vital war making resources, they needed a mercantile class to exploit the resources, and they needed to campaign on another's territory for forage and sustenance. These critical factors played a significant role in the RMA. As the economic life changed, so changed the military. With money and resources, and a robust mercantile class, better arms could be manufactured, better uniforms made, better medical care given, better transportation and roads were available, and the list goes on.

Politically, the government of the state now had a powerful resource, in the military, when dealing with other states. Bureaucracy flourished and the will of the state became the aim of the military.

Paradigm

The component parts of a paradigm for the RMA of early modern Europe now clearly and readily emerge. The five component parts of this paradigm are the precursors, theoretical shift, force modeling, technological advancement and a doctrinal shift.

Precursors. The political social and economic factors that were present and necessary during the RMA of early modern Europe. All were important to the extent that all had to be present for the RMA to occur at all.

Theoretical shift. Before the RMA of early modern Europe, warfare was limited in scope and duration, and consisted of usually prolonged sieges and largely irrelevant maneuverings. Limitations on trained manpower, logistics, and funds meant that decisive battles were rarely fought. Thus, the theory was one of "limited positional warfare" fought by limited means where risks were avoided and decisive actions unlikely.³¹ After the RMA, there emerged a theory of decisive war based on the concept of the decisive battle. Incumbent in this shift is the identification of the primary threat force or force model and the will to then overcome that force.

Force Modeling. As these models demonstrated their success on the battlefield, they were copied by the other militaries in Europe. The development of evolving military systems into particular models can be seen during this period. Each model became successively more articulated, mobile and effective, and yet still resembled previous models. Weapons aside, there was not a radical departure in appearances between the successive models, but there was a radical departure in tactics, doctrine and organization. All of the models included pike, artillery, handgunners and cavalry, yet each employed them differently.

Technological advancement. Technical innovations were most assuredly important during this military revolution. Better firearms, with increased accuracy and faster rates of fire, improvements in artillery making it more mobile, and the *trace italienne* are all innovations with which led directly to the RMA. It is clear that there could not have been an RMA without the technological innovations in firearms, artillery, and *artillery fortresses*. Yet, it is important to note that the technological advantage enjoyed by one side or the other was always short-lived.

Doctrinal Shift. This was a period of great doctrinal and organizational synthesis. The doctrine changed to reflect the emerging theory of decisive warfare and the organization then changed to facilitate the implementation of doctrine. Without the changes in doctrine and organization, the technological and tactical innovations would have been worthless. As an example, we need look no further than the *Swiss model*. If the arbusquers to the front and rear of the formation possessed matchlock muskets, with no other changes, would they have revolutionized warfare? They might kill and wound more enemy before retreating into the pike formation, and might even help win battles by preventing the formations attack from the rear, but this would hardly be a revolution. The semi-articulated formations of the Swiss, with better firearms, were more effective, but they still would have suffered defeat at the hands of the more articulated *tercios*. It was not just the *introduction* of technology but the *application* of technology that was paramount. There had to be doctrine and organization to facilitate the application of technology and tactics.

CHAPTER III

This chapter will determine whether there is currently an RMA underway. The five component parts of the paradigm of early modern Europe's RMA compared to circumstances surrounding the current posited RMA will yield the appropriate answer. According to Michael J. Mazarr, a former Senior Fellow in International Security Studies at the Center for Strategic and International Studies:

"No true revolution in military affairs is a narrowly military phenomenon. It is in the most fundamental sense, the product of a broad social and political transformation which gives rise to new military organizations and technologies. Together, these changes demand substantial reforms in existing methods of conducting warfare."³²

This is not to say that each of the components of the RMA of early modern Europe must be exactly the same today in order to provide an appropriate paradigm. However, they must be present in sufficient orders of magnitude to make the comparison worthwhile and this chapter will show that to be the case. If we assume that the 16th Century was really the time of an RMA then we can extrapolate the factors, which made it an RMA and apply that against the transformations of today to determine whether we are in an RMA.

Precursors

As previously noted the precursors are the social, political, and economic factors that needed to be present for the RMA of early modern Europe to occur. The social aspects of the earlier RMA included manpower availability and requirements as well as class iconoclasm. Today there are also great social forces at work on the human landscape. The rapid increase in population was one of the most important factors contributing to the

RMA of early modern Europe. Significant increases in population size provided the necessary manpower to increase the size of armies and the scope of warfare. Today the populations of Western Europe and the United States are increasing at a slower rate than during that previous period. However, the total combined population of Western Europe and the United States as of the year 2000 is over six hundred million.³³ This current population provides the necessary manpower to conduct large-scale, modern war. There are also additional social forces currently at work.

Overall, the world population continues to grow at unprecedented rates, the gap between the developed world and the developing world grows ever wider, ethnic rivalries and conflicts abound, ecological threats are present on a potentially massive scale, mass migrations, famine, and epidemics abound. Large-scale social pathologies of transnational and international proportions such as narco-trafficking, organized crime and terrorism are becoming endemic. The peace and stability of large regions is threatened by such social calamities.³⁴

Economically, there were radical increases in the funds available to the states of early modern Europe to fuel their RMA. Today there are no radical increases in funds available to the Western Powers, but there are sufficient funds for military innovations and even radical changes. The previous RMA required that states not only needed to possess the wherewithal to maintain militaries, but their strategies became inextricably intertwined with economics. Today, the economies and the militaries of the world are also interconnected with the economies producing the wherewithal to sustain a nation's military potential. Previously the military took the lead in the material innovations required to maintain and modernize a military force through consistent leadership in the

development of technical and technological breakthroughs. Currently the civilian sector is taking the leading role in producing the technical and technological breakthroughs that are necessary to field a modern fighting force. Many smaller and more fiscally aggressive and profitable companies are now providing the solutions to a myriad of defense related problems. Combined with the shrinking defense budgets in First World nations, the budgetary environment has forced many more changes in the military's relationships to the greater civilian economy than was possible in the recent past.³⁵

As with the previous RMA the government of the state has a powerful resource, in the military, when dealing with other states. Bureaucracy flourishes and the will of the state is the aim of the military. Today Western Europe and the United States have stable central governments with functioning bureaucracies. Throughout the modern world, there are numerous examples of stable and effective central governments with functioning bureaucratic apparatus. Western Europe, the United States, Canada, Japan and the Republic of Korea are notable examples of strong central governments possessing bureaucracies capable of collecting and managing the funds and resources necessary for an RMA.

During the RMA of early modern Europe, the precursors developed in a short time and were unprecedented. Today the same precursors are present, although they have not necessarily appeared in a revolutionary and radical way. What is important here is not that the precursors appeared within a short time, but that they previously fuelled an RMA. Previously the burgeoning population, increased social consciousness, economic wherewithal and political apparatus enabled an RMA. Today there is sufficient population, social consciousness, economic means and the political will and apparatus to

again fuel an RMA. Socially, economically, and politically the precursors for an RMA are present and are consistent with the precursors for the RMA of early modern Europe.

Theoretical Shift

From the RMA of early modern Europe there emerged the theory of decisive battle and the conduct of battle on the decisive shock. After the previous RMA, there was a theoretical shift away from decisive battle toward operational battle. The emergence of the operational art largely determined the way in which conventional warfare was fought in the last century. Today there is a theoretical shift away from the operational battle towards decisive operational battle. This is not operational war by another name through the implication that operational warfare is decisive in and of itself. This is a movement towards the single decisive battle, perhaps better expressed as a movement back.³⁶

The ***decisive operational battle*** is defined by space, time and simultaneity. A decisive operational battlefield is characterized by very large area, affected throughout its width and depth near simultaneously, with the battle decided in a relatively short time. This type of warfare takes on the characteristics of both the decisive battle and the operational battle and is yet not wholly either. The operational art has battles fought for freedom of action while the decisive battle seeks the destruction of the enemy.³⁷ Warfare practiced with massive firepower and precision weaponry must focus on the effects of those fires, i.e., destruction. While at the same time distributed maneuver maintains much of the spatial and temporal extension, force distribution and unity of effort. The battlefield expanded by operational theory is now one single battlefield and the focus is now the enemy once again.³⁸

Operational art and distributed operations seek not the destruction of the enemy's army, but the destruction of the enemy's entire capacity to wage war.³⁹ That is becoming less and less the case. Collateral damage and noncombatant casualties are real concerns and are avoided, especially by NATO countries. Campaigns, which have recently taken place sought not to completely destroy production capabilities, food production, infrastructure and in short the enemy's entire capacity to wage war. The political implications and nation rebuilding requirements are increasingly precluding such total destruction. Although the physical areas implied within operational theory are great, the modern appliances of warfare compress the time and space of action. The battlefield can now be observed, traversed and effected by destructive fires and decisive actions throughout its width, and depth near simultaneously. This implies that the operational battlefield is now becoming a larger decisive battlefield. Jeffrey R. Cooper, the Director of Strategic Analysis at SRS Technologies, alludes to this phenomena.

“By relying on intensive rather than extensive destruction, a combination of information dominance and precision weaponry should, in theory, allow a comparatively small American expeditionary force to defeat much larger enemy formations.”⁴⁰

The compression of time within the decisive operational battlefield is one of the key components of the new theory.⁴¹ The decisive battle can now be fought on an operational-sized battlefield within a relatively short period of time and it must be if a relatively small number of soldiers with precision weaponry hopes to win. The greatest example of this trend is Operation Desert Storm. Fought on an operational-sized battlefield, hundreds of thousands of soldiers clashed for just over thirty days in a very large decisive battle.⁴² Although primarily an air operation, Kosovo is another example of

this type of theoretical shift as is the 1973 War between the Arab nations and Israel.

Drew Middleton in *Crossroads of Modern Warfare* illustrates the compression of time and the extended distances of a single modern campaign.

"It was in fact a single campaign fought on two fronts. From a historical perspective the time spent fighting was brief; the campaign was concluded in fewer days than it took the Normandy invasion to develop its second phase; in the great encounter at Stalingrad, the Russians and the Germans had only begun after twenty-one days to feel out each other's strengths and weaknesses."⁴³

Another key point that is illustrative of the theoretical shift is the ability of the modern force to mass effects. Operational art is based on the distributed campaign, while the decisive battle sought concentration at a single point.⁴⁴ Modern weaponry now allows for the concentration of effects on a single point while the force as a whole is distributed. This once again shows the blending of the two theories of combat.

The operational level of war fights campaigns and major operations to accomplish strategic objectives within theaters or areas of operations. The campaign is a series of military operations and major operations accomplish operational and sometimes strategic objectives.⁴⁵ The rapidity and simultaneity of the decisive operational battlefield blurs these distinctions. Campaigns thus become either very rapid or major operations supplant them and become decisive in themselves. Given the predication that smaller numbers of soldiers with sophisticated means must fight and win future conventional wars, the wars must by their very nature be short, given the great difficulty or inability to sustain combat indefinitely with either arms or personnel. Decisive battle decline as a theory because warfare became less efficient and less decisive. This led to the focus on the destruction of means of war and distributed maneuver. Battle is once again becoming more efficient

and the focus is shifting in a fundamental way.⁴⁶ The shift towards decisive battle is fundamental to the way we plan to wage war in the future and is centered around information gathering, processing, dissemination and precision weaponry⁴⁷ Incumbent in this shift is the identification of the primary threat force or force model. The primary threats in this case are mid to high intensity forces, which rely on a substantial industrial and technological base for support.

Force Modeling

Currently there is a rise in the ascendancy of information and precision-strike-centric warfare with this model of warfare is best exemplified by the Western militaries with the United States the leading proponent. Other nations throughout the world are attempting to mimic this method of combat. Nations which possess industrial age technology are capable of combining information and precision-strike capabilities, to varying degrees, and some are actively attempting to do so. This modeling phenomena is not limited solely to industrial age societies, as even agrarian nations attempt the replication of the Western model. According to David Jablonsky, the Professor of National Security Affairs at the U.S. Army War College: “As a consequence, there are today approximately 20 countries with regionally significant Second Wave (Industrial Age) militaries, and some of these as well as a few First Wave (agrarian) countries are attempting to gain Third Wave technology.”⁴⁸ The current attempts at modeling are perhaps best exemplified by the Chinese military.

The Chinese have carefully watched the advent of precision and information centric warfare with great interest and are currently attempting to close the gap between the advanced militaries of the world and their military by adopting the Western model.⁴⁹ The

Chinese viewed several significant events along the path of the development of the Western model of warfare as significant. They saw the Israeli strike against the Iraqi nuclear reactors in 1981, the Falklands War in 1982, Israeli actions in the Bekka valley in 1982, and the U.S. strikes against Libya in 1986 as the first examples of a new style of war.⁵⁰ These first actions provided a hint of what was to come. The Gulf War in 1991 was a seminal event and ushered in a military revolution in the eyes of the Chinese. "Following the rapid development in information technology, stealth technology, and long-range precision strike technology, the Gulf War, which occurred at the beginning of the 1990s, opened the curtain on the information war era and marked the sudden appearance of the third military revolution."⁵¹ The Russians are likewise attempting to adopt the Western model.

The Russians have also viewed the Gulf War as an important showcase of modern military capabilities, and are developing a body of defense literature to reflect current changes in warfighting. David R. Beachley, with the Science Applications International Corporation states: "Western thinking on developments in warfare, particularly U.S. military thought, is leading some Russian strategists to discuss what are characterized as new war concepts."⁵² The Russians are intent on developing capabilities based on the Western Model, but within their own limited economic capabilities, and based on their wartime experience in Chechnya. The commander of the Rocket Troops and Artillery for the Russian Ground Forces, Colonel General Nikolay Dimidyuk argued that the Russians must combine information with what he calls "Fire Destruction of the Enemy". This emerging method of Russian Hi-tech warfare could initiate fundamental changes in the Russian military to include organizational and doctrinal changes. Dimidyuk realized

that Russia is constrained in its full participation in the Western Model by economic considerations and may be only capable of slowly exploiting the potential of this new way of warfare.⁵³ This Russian exploitation of the Western Model is revealing. It exposes that the modeling process is never an exact duplication, militaries will model within their capabilities and that modeling could lead to the emergence of model variants.

Overall, this section clearly shows that there is a new model of warfare that is still developing and its chief proponent is the United States. Militaries from around the world are attempting, within their capabilities, to adopt this Western Model of warfare.

Technological Advancement

Technological advancement and innovations are fueling the continued development and refinement of the Western Model of warfare. Information warfare and precision strike capabilities are based upon technological premises and are intertwined with the Western Model. Microprocessors and digital technology are enabling a vast number of developments, which are militarily significant. These technological enablers are responsible for a host of military developments, which include standoff platforms, precision strike capabilities, stealth, information dominance, improved communications, "smart" weapons, computers and digitization.⁵⁴ The interconnectedness between warfare and technology is wholesale, influencing virtually every aspect. This is not to say it is the most important aspect of the paradigm, yet without it there would be no modern warfare. "...war is permeated by technology to the point that every single element is either governed by or at least linked to it."⁵⁵ Currently the hi-technology revolution is the province of the developed nations of the world, but the number of developed nations with the capability to produce the modern appliances of war is growing. As the numbers of

developing nations increases, so does the pace of technological development. The more participants in the Information Revolution the more minds there are to exploit, dominate and utilize it. Future technological developments and possibly breakthroughs could be initiated by nations other than those currently considered developed.⁵⁶ The technological foundations for current military as well as private sector development is hard to over-estimate and are indeed influencing this development ever bit as much as the RMA of early modern Europe was influenced by its own technological imperatives.

Doctrinal Shift

The earlier RMA was a period of doctrinal and organizational synthesis. The current era is no exception. Doctrine must change to reflect the re-emerging theory of decisive warfare and the organization of forces must change to facilitate the implementation of doctrine. According to David Jablonsky:

"A true revolution, the study included, would require a holistic effect provided by the integrating framework of doctrine and organization coupled with the enabling capabilities (e.g., information dominance, C2) and the executing capabilities (e.g., smart weapons, major platforms) provided by technology. One without the other more often constitutes an evolution."⁵⁷

Currently the U.S. Army's doctrinal foundation is under revision to reflect the dynamics of the changing world environment and the emerging theory of warfare. The two major documents under revision are FM 3-0 (100-5), the Army's capstone doctrinal field manual for current operations, and TRADOC PAM 525-5, which is the Capstone Operational Concept that describes *The Army's* vision of future operations. Also changing is the organization of the U.S. Army.

As the U.S. Army is currently experimenting with a medium brigade force structure, and if successful, will implement that force structure in the near future. The organization of the Interim Brigade is a significant break from previous brigade organizations and is possibly the forerunner of additional and significant organizational changes within the U.S. Army. Additionally the limited conversion division force structure is another departure from previous organizational structures that is attempting to leverage the promises of digitization. Other forces throughout the world are also changing their doctrines and force organizations, or at least taking steps in that direction, in order to take advantage of technological breakthroughs.

The armed forces of the Russian Federation are examining their current doctrine in an attempt to develop practical applications for the battlefields of the future.⁵⁸ China is likewise attempting to change their doctrine and organization to better take advantage of modern information and precision-strike warfare capabilities.⁵⁹ Whether they are ultimately success or not remains to be seen, and whether these examinations ever result in concrete doctrinal or organizational changes is a matter of speculation. However, it is of paramount importance to note that the militaries of world realize the military landscape is significantly different and they must adapt doctrinally and organizationally to the new theory of war. Based on the evaluation of the component parts of the paradigm model compared to the factors of today it can now be determined whether there is currently an RMA underway.

All of the precursors necessary for an RMA to take place are currently available or in place, much like they were for the RMA of early modern Europe. The attendant social, economic and political factors, which can cause, sustain, or enable an RMA are readily

apparent. There was a significant shift in military theory created recently which is in turn driving doctrinal and organizational changes. Added to these factors are the significant and instrumental technological forces, which are at work, and the fact that various militaries around the world are modeling the preeminent model of warfare, namely the Western Model. The facts as illustrated and elaborated in the above paragraphs, leads to the conclusion that there is currently an ongoing RMA in conventional warfare.⁶⁰ The previous discussion also shows the utility of the paradigm of early modern Europe in determining whether there is currently an ongoing RMA.

Chapter IV

The component parts of the current U.S. Army Transformation will now be examined. Analysis of the component parts of the U.S. Army Transformation is necessary so that they can be clearly identifiable in preparation for comparison to the paradigm of early modern Europe. Once the component elements of the current Transformation are clearly articulated, they can then be compared to the paradigm of early modern Europe to see if that paradigm is illustrative and appropriate. The U.S. Army leadership realizes that the world is changing technologically and that the international security environment has also changed. These are the two driving forces behind the Transformation; the need to defeat potential challenges and the need to take advantage of new and emerging technologies.⁶¹ The Transformation consists of three parallel vectors: the legacy, interim and objective forces all developed along first parallel and then convergent lines. This method of development ensures that current forces can meet their obligations without degradation while new capabilities are developed.

The Transformation Strategy is first and foremost a conditions-based strategy designed to support national security requirements while sustaining current capabilities. The pace of the Transformation of the Army is not predetermined, requiring careful management as it progresses from the legacy to objective force. The pace of Transformation will thus be as rapid as possible without sacrificing capability. The most visible changes will occur in the operational forces, yet the Institutional Army will begin to change immediately to ensure continuity of concepts and doctrine. The Transformation of the Institutional Army addresses the systems, organization, doctrine, leader development, infrastructure management, sustainment and material development.⁶² By changing the Institutional Army first, the Army leadership realizes the key role that its conceptual framework plays in the Transformation. The next forces to change are the operational forces.

The legacy force is the current force structure consisting of heavy and light divisions. Since the interim force is expected to grow to only 5 to 8 brigades by the end of the decade, the legacy force will still conduct the majority of the Army's missions. The legacy force is the backbone, which will support the Army as the Transformation moves forward. The legacy force will modernize through recapitalization and the fielding of new equipment, which was previously programmed. The bridge between the legacy force and the objective force is the interim force.

The Army has begun fielding two Initial Brigade Combat Teams (IBCT) as the first steps in the construction of the interim force. The interim force attempts to achieve the characteristics and capabilities of the objective force as a rapidly deployable warfighting asset. It is envisioned that the interim force will act as an early entry force into a particular theater to facilitate the arrival of heavy forces, otherwise known as the decisive

campaign force. The strategic responsiveness and ability to alter conditions will enable the decisive campaign force will also hopefully lead to a more rapid termination to any conflict. The interim force will fulfill this role until such time as the objective force is online. The interim force will be equipped with a family of medium-weight armored vehicles, which enhance deployability without sacrificing lethality or survivability. The Army XXI equipment and the acquisition off-the-shelf technology will allow the interim force to leverage information technology. As an added benefit the IBCT will provide an opportunity for the Army to train leaders and soldiers in the developing organization and doctrine of the objective force.⁶³ The objective force will eventually replace the interim force and assume the role as the preeminent Army organization.

The objective force will retain the rapid deployability of the interim force combined with enhanced weapons, intelligence and communications systems. The path the Transformation takes as it moves towards the objective force will undoubtedly be influenced by the security environment, and social, economic, political and technological factors. Other than attempting to achieve a specific set of capabilities, the organization, doctrine and equipment of the objective force are not yet well defined. The objective force capabilities will include strategic responsiveness, operational and tactical mobility, lethality, survivability, and the ability to collapse the traditional phases of a joint campaign into a single, seamless campaign. The hardware centerpiece for the objective force is the future combat systems (FCS). The FCS is currently not on the drawing board, but is slated to enter service within 10 years and be fully fielded within 20 years. Conceptually, the FCS will not be a single system but will be a number of separate platforms with each fulfilling a different function.⁶⁴ The future will likely see parts of

each of the forces, legacy, interim and legacy, working within the same theater. One of the greatest foreseeable challenges the Army will contend with is the fusion of these varied forces into a coherent, functional whole.

The Army has identified the potentiality of combining dissimilar forces as reality. The name given to this combination of forces is the "hybrid mix". Each force will be capable of full spectrum operations, but commanders will have to realize that all forces are not equal. Organizing the battlespace and the campaign fight to utilize the capabilities of each force to the fullest will require detailed planning. The utilization of dissimilar forces is nothing new to Army operations, but new technological developments and organizational structures could significantly highlight the differences.⁶⁵

These then are the significant components of the U.S. Army Transformation laid bare. Firstly, it is driven by the new and changing world security environment. Secondly, the Transformation is heavily influenced by current and emerging technology, specifically digital technology. Thirdly, it is made of three distinct operational force structures, legacy, interim and objective along with the Institutional Army and its specific responsibility for the conceptual framework of the Transformation.

Chapter V

As previously noted, the paradigm of early modern Europe was appropriate in determining that there is currently an ongoing RMA. Therefore, if there is an ongoing RMA the transformation should take advantage of it and if possible control it to the transformation's advantage. The purpose of this chapter then is first to determine if there is a direct linkage between the current RMA and the U.S. Army Transformation. This will be done by comparing the paradigm of the RMA of early modern Europe to the

current Transformation. Secondly, as the paradigm is compared to the current Transformation it should illustrate potential paths for the Transformation to take or at least issues for it to address. The objective force needs to look beyond its current limitations and constraints to become a better force. The comparison of the paradigm to the transformation should highlight these limitations and provide alternative directions and possibilities. Lastly, and most importantly the comparison of the paradigm to the transformation will determine whether the paradigm is illustrative and appropriate to the transformation. Each of the five components of the paradigm will be compared to the transformation and analyzed as it specifically impacts upon the Transformation. The analysis on the potential directions for the Transformation to take or issues for it to address will take place during the comparison of each of the paradigm's components.

Precursors

The precursors are the social, political, and economic factors that needed to be present for the RMA of both early modern Europe and today to occur. As noted in a previous chapter societal issues throughout the globe are making the world more unstable and dangerous. This has the obvious impact on the Transformation that the likelihood of U.S. involvement and deployment of combat forces increases.⁶⁶ It also has implications for force development since the threats arising from these societal conditions could range from criminal to conventional. Lastly are the social factors impacting on the force itself. High operational tempo and the overextension of U.S. Armed Forces is effecting retention and recruiting.⁶⁷ These social forces affect the type of threats the U.S. could face and should be designed to face, and the internal considerations of taking care of the military society required to carry out the nation's political will.⁶⁸

Economically, the monies available to conduct the Transformation are available within the United States government's budget. However, this does not mean that the military will be given this money for the transformation. Combined with the need to still maintain a very costly legacy force this means that every expediency to reduce costs should be employed. Off- the-shelf technology, out sourcing and other cost savings means should be optimized, yet not at the cost of the defense industry. The Transformation requires a strong and innovative defense related industrial base. Cost saving but not at the expense of critical infrastructure will require careful management and is an imperative. The appropriations required for the Transformation are enormous and it cannot take place without significant resources. When analyzing potential threats it is important to note that economic powerhouses are not the only potential competitors and that history abounds with examples of countries deriving economic wealth from conquest after sacrificing to build up their armed forces.⁶⁹

Current U.S. political willingness to use the military in non-traditional and non-conventional roles and the expectation of casualty-free war could affect the Transformation. This could lead to more emphasis on firepower and machine only developments for conventional operations and the increased deployment of ground forces in peacetime contingency roles only. Both aspects should be incorporated into the Transformation, yet neither should be taken into consideration divorced from the other. Firepower and machines are necessary, not to the exclusion of soldiers and peace time contingencies will continue to occur, but should not be at the expense of warfighting skills.⁷⁰

The social, economic, and political precursors are thus applicable for illustrating major aspects of the transformation. The precursors also provide insights on potential shortfalls and alternative means to pursue during the transformation. The precursors are necessary for the RMA and their applicability to the transformation shows the linkage of the transformation to the RMA.

Theoretical Shift

The theoretical shift towards decisive operational war requires a shift in the conceptual framework of the Army. The goals of strategic responsiveness along with the ability to conduct entry, build-up, decisive operations, and transition seamlessly are admirable and are in response to this theoretical shift.⁷¹ The problem persists that opportunities are potentially being overlooked. The need to conduct operations throughout the width and depth of the decisive operational battlefield near simultaneously means air, land, and sea forces must be integrated as never before. The needs for better and more efficient joint operations should be a major goal of the Transformation.⁷² Equipment, systems, doctrine and even thought processes must be interoperable whenever possible throughout the entire Armed Forces. The theoretical shift means that those forces, which can accomplish decisive operational warfare effectively, will be the victors. Additionally the U.S. is focused in the mid to high ranges of conflict, which given a choice is probably correct, but threats from the lower end of the spectrum need adequate address. If forced to battle agrarian societies our ability to conduct decisive operational battle will be tested in that environment. That is not to say that it cannot be done, yet it will take determination and unfortunately casualties to do so.⁷³

This component of the paradigm illustrates that the transformation is responding to the current theoretical shift by attempting to conduct operations simultaneously over great distances more rapidly than previously. This component of the paradigm also highlights several aspects of the transformation that need address. Namely, that seamless joint operations should be a goal of the transformation and that asymmetrical threats are not adequately taken into consideration.

Force Modeling

As the Army transforms and continues to develop and refine its information and precision strike centric warfare capabilities it must keep a wary eye out for adversaries doing the same. U.S. forces are the world's asymmetrical force with other nations realizing they can emulate our model of warfare or perish on the conventional battlefield. This does not mean that other nations will not somehow find a way to combine information and precision strike in more effective or different ways than U.S. forces.⁷⁴ When a peer competitor does arise it will most likely be indistinguishable from U.S. conventional forces in appearance. It will have armored vehicles, artillery, and infantry.⁷⁵ The organization, doctrine and training are what will set it apart. Beyond identification the U.S. will have to be prepared for a fight where our asymmetrical advantages are equaled by an adversary. Although no such matching force is currently on the horizon, it will be.⁷⁶

This component of the paradigm should lead the Army leadership to realize that other forces will model the Western Model and possibly develop effective counters or even other more advanced models. In this capacity the paradigm illustrates that the

transformation can never be fully effects based and must take into account actual forces, which are in existence and attempt to anticipate those, which aren't.

Technological Advancement

Technology is one of the pillars of the transformation and is also a component of the RMA as a whole.⁷⁷ Problems arise when U.S. forces and leaders view technology as an end in itself and the answer to success on the battlefield.⁷⁸ Continued exploitation of technology should obviously continue, but not at such breakneck speed that sight is lost of interoperability. The technological advantage currently enjoyed by U.S. forces will certainly be matched or overcome by other nations.⁷⁹ Thus complete reliance on technology is folly. The transformation is an obvious attempt to leverage technology and this is in line with the paradigm. Adolphus Gustavus, the Swiss Columns and the Spanish *tercios* all utilized technology to their advantage during the RMA of early modern Europe. That trend is continuing through the transformation.

Doctrinal Shift

The conceptual framework of the Transformation is well advanced, with doctrine changing and organizational experimentation ongoing. However, thinking beyond current organizational patterns is a necessity. More open organizations and the doctrine to fight these organizations should be an outcome or goal of the Transformation. Decentralization should be a key component of the success of fighting the FCS and the most effective way to decentralize effectively is through organizational changes. Current Army hierarchical layouts preclude openness and must be reviewed with an eye towards creating units capable of fighting over extended distances with mission oriented orders.

Every part of the conceptual framework should be open to honest examination.

Everything from organization, doctrine, and leader development to thought processes such as the Military Decision Making Process should be part of this examination.⁸⁰

The paradigm of the RMA of early modern Europe proved its utility in determining that there is currently an RMA taking place. The component parts of the Transformation show that it is a result of the current RMA and is actually an attempt to harness and control the RMA. The ability to harness and control an RMA have historical precedence. During the RMA of early modern Europe Adolphus Gustavus also attempted to harness and control the RMA. By leveraging technology, developing new doctrines and organizations, using the precursors to his advantage and realizing an opportunity to create a theoretical shift towards decisive battle Gustavus harnessed the RMA and controlled it to his advantage. Gustavus undoubtedly never used the term RMA, yet he was well aware of the circumstances of his day and the rapid changes taking place and used them to his advantage. Since the transformation is driven by the changes in the new security environment it is an attempt to adapt to the new theory of warfare; it is heavily influenced by powerful new technologies; it is significantly changing organizations and doctrine. All of these prove that the U.S. Army Transformation is a result of the current RMA. The movement from legacy to objective force, with the composition of the objective force still unclear in terms of systems, equipment and organization, is clearly an attempt to harness the current RMA and control it.⁸¹ The current RMA provides significant opportunity for the Transformation. It is not only possible to harness the RMA, but to move it in particular directions during the Transformation.⁸² This does not mean that the RMA can completely change complexion, because there is a framework that it must adhere too, but

the Army can shift the RMA to its advantage through the above suggestions derived from analysis.⁸³ Finally, analysis has shown that there is an RMA paradigm, derived from the study of the RMA of early modern Europe, that the paradigm determines there is currently an ongoing RMA, and that the paradigm is illustrative and appropriate for the United States Army Transformation?⁸⁴

¹ Geoffrey Regan, *The Guinness Book of Decisive Battles*, (Middlesex: Guinness Publishing, 1992), 105-108; J.F.C. Fuller, *The Decisive Battles of the Western World, Volume II* (London: Eyre & Spottiswoode, 1955), 61-75; David Eggenberger, *A Dictionary of Battles*, (New York: Thomas Y. Crowell Company, 1967), 59-60.

² In each case, though, "revolution" refers to a rapid reversal in the state of affairs. The length of time involved can range from a year to a century, depending on the scope of the revolution—depending on whether it is a government, a social structure, an idea, or an economy which is overturned—but in none of these cases does the time-frame during which the reversal takes place exceed a single (maximum) human lifespan. Geoffrey Parker, *The Military Revolution*, Second Edition, (Cambridge: University Press, 1996), 157. The Department of Defense's Office of Net Assessment defines an RMA as a major change in the nature of warfare brought about by the innovative application of technologies which, combined with dramatic changes in military doctrine, and operational concepts, fundamentally alters the character and conduct of operations. Earl H Tilford, *The Revolution in Military Affairs: Prospects and Cautions*, (Strategic Studies Institute, U.S. Army War College 1995), page 1.

³ Lt. Gen. Theodore Stroup Jr., *The Ongoing Army Transformation*, in *Army Magazine*, July 2000, 7-10.

⁴ On the one hand, it stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community. On the other, it denotes one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science. Thomas S Kuhn, *The Structure of Scientific Revolutions*, Second Edition, Enlarged (Chicago: University of Chicago Press, 1970; Reprint, Chicago: University of Chicago Press, 1962), 175.

⁵ Yet it remains true that purely military developments, of a strictly technical kind, did exert a lasting influence upon society at large. Michael Roberts, *The Military Revolution, 1560-1660*, in *The Military Revolution Debate*, (Boulder: Westview Press, Inc. 1995) 13.

⁶ Roberts, *The Military Revolution, 1560-1660*, in *The Military Revolution Debate*, 13.

⁷ But it was not only that armies were tending to become permanent; it was also that they were rapidly becoming larger. And this I take to be the result of a revolution in strategy, made possible by the revolution in tactics, and made necessary by the circumstances of the Thirty Years' War. Roberts, *The Military Revolution, 1560-1660*, in *The Military Revolution Debate*, 18.

⁸ The transformation in the scale of war led inevitably to an increase in the authority of the state. Only the state, now, could supply the administrative, technical and financial resources required for large-scale hostilities. Roberts, *The Military Revolution, 1560-1660*, in *The Military Revolution Debate*, 20.

⁹ While military expansion before 1659 rates as substantial, that occurring after 1659 was staggering. By the end of the century, theoretical wartime levels had increased 500 to 800 percent over the peaks of the sixteenth century. Discounted tallies rose 400 to 700 percent. Peacetime levels rose by even greater percentages; if theoretical peacetime figures before 1610 were normally between 10,000 and 20,000, the peacetime strength after 1679 hovered between 130,000 and 150,000, an increase of 650 percent to 1500 percent! John Lynn, *Recalculating French Army Growth During the Grand Siecle, 1610-1715*, in *The Military Revolution Debate*, (Boulder: Westview Press, Inc. 1995) 133.

¹⁰ Given this overwhelming superiority of the defensive, it might reasonable be asked why pitched battles occurred at all. David Parrott, *Strategy and Tactics in the Thirty Years' War: The 'Military Revolution'*, in *The Military Revolution Debate*, (Boulder: Westview Press, Inc. 1995) 239.

¹¹ Inadequate administration, or the limited Contribution-potential of the main campaign theatre sharply constrained the commander's freedom of action. Large-scale transport of supplies-despite the establishment of rudimentary frontier magazines-was beyond the capacities of the early modern state, which could raise troops but not the horses, wagons and food supplies required to support them on an extended campaign. Parrott, *Strategy and Tactics in the Thirty Years' War: The 'Military Revolution'*, in *The Military Revolution Debate*, (Boulder: Westview Press, Inc. 1995), 242.

¹² Many of the developments described by Roberts also characterized warfare in Renaissance Italy: professional standing armies, regularly mustered, organized into small units of standard size with uniform armament and sometimes uniform dress, quartered sometimes in specially constructed barracks, were maintained by many Italian states in the fifteenth century. Geoffrey Parker, *The 'Military Revolution, 1560-1660' - A Myth?*, in *The Military Revolution Debate*, (Boulder: Westview Press, Inc. 1995) 38.

¹³ Geoffrey Parker, *The Military Revolution*, 1-44.

¹⁴ Eltis goes on to say, "Strategy, the structure of command, training, and organization underwent profound changes as a result. David Eltis, *The Military Revolution in Sixteenth-Century Europe*, (London: Tauris Academic Studies, 1995) 43.

¹⁵ "In essence, the Swiss adopted the phalanx system of deploying their pikemen. The first four ranks of pikemen would level their weapons to create an impenetrable wall while the fifth and remaining ranks would hold their weapons upright, ready to fill in any gaps. Because of its length, the pike was held differently by each of the four ranks. The front rank would kneel down with the weapon held low, while the second stooped with the butt held under their right foot. The third rank held the pike at waist level, and the fourth rank held it at head height. This classic defensive formation could stop any cavalry charge; and where the ranks of pikes were deeper and the weapons held upright, such a forest of close packed staffs could afford considerable protection against the fall of enemy arrows." Douglas Miller, *The Swiss at War: 1300-1500*, (London: Osprey Publishing. 1986) 13.

¹⁶ Miller, *The Swiss at War: 1300-1500*, 34.

¹⁷ Eltis, *The Military Revolution in Sixteenth-Century Europe*, 6-33.

¹⁸ Miller, *The Swiss at War: 1300-1500*, 17.

¹⁹ The Burgundian Wars illustrated a number of tactical developments. Firstly they demonstrated quite forcefully the redundancy of the mounted knights. Secondly, they revealed the flexibility of the Swiss battle formation; and thirdly, they showed how important the pike had become as the prime infantry weapon. By the end of the 15th century over two-thirds of the infantry were to be armed with the pike. Miller, *The Swiss at War: 1300-1500*, 31.

²⁰ "By 1525 France had been campaigning in Italy for over 30 years." 1525 is when the Battle of Pavia was fought, effectively ending the Italian Wars. Konstam, *Pavia 1525*, 7.

²¹ Sir Charles Oman, *A History of the Art of War in the Sixteenth Century*, (Mechanicsburg: Stackpole Books, 1999; reprint, London: Greenhill Books, 1987) 185.

²² Angus Konstam, *Pavia 1525*, (London: Osprey, 1996) 19. From caused which it is impossible to discover, the Spaniards had taken to the smaller firearms much earlier than the French or the English or the Italians to all of whom they were unfamiliar in 1495-though the Burgundian dukes, the Hussites, and even the Swiss, had already begun to employ them a generation earlier. Sir Charles Oman, *A History of the Art of War in the Sixteenth Century*, 52.

²³ Following Pavia, the Spanish infantry basked in a deserved glory and for the next 100 years, they were considered the finest troops in Europe. Konstam, *Pavia 1525*, 20.

²⁴ The most striking fact in the 'tercio' organization is that we find only pikemen and arquebusiers. There is no mention of the once-celebrated 'sword-and-buckler men' whom Machiavelli so much admired, and we discover only the modest number of eight halberdiers, and they apparently attached to the person of the commander of the 'tercio' as bodyguard, or perhaps rather as orderlies. The companies or bands, which used to be separate units though often employed in blocks of any number from two to ten, now form one large regiment-almost we would say brigade. Sir Charles Oman, *A History of the Art of War in the Sixteenth Century*, 59.

²⁵ "Sixteenth-century pike-squares were made up of several layers. In the exact centre of the pike-square stood the ensign. Around him men with halberds formed an inner square, protecting him against attack from all four directions. Outside this central box of halberdiers stood the pikemen, who lacked defensive armour, then came a layer of pikemen with corslets of armour plate and finally the outer coating of muskets and arquebusiers, whose job it was to shelter under the pikes of their companions ready to discharge when the time came." Eltis, *The Military Revolution in Sixteenth-Century Europe*, 54.

²⁶ Tournhout- "But at any rate he ordered Francis Vere's 300 arquebusiers to press in upon the rear of the Neapolitan tercio, and at the same time threw in against it flank first three cornets of horse under Vere, and then three others, which had been set aside as his supports, keeping only two in reserve. Whether it was that a simultaneous attack by horse and arquebusiers was demoralizing to troops hurrying away along a road, or whether the Spaniards had already noted the disaster at the head of the column, we cannot say. But instead of facing outward and leveling pikes to the flank, the men of the tercio flinched before Vere's charge and broke, scattering across the moor, every man for himself, as Sulz's Germans had already done.

Nieuport-"This is a most interesting fight from the tactical point of view. Though the most brilliant victory achieved by Maurice of Orange during his long military career, it was by no means creditable to him as a strategist, and though he won a complete success, its results were negligible-the town which he had set out to besiege did not fall into his hands, and the campaign was a failure. Sir Charles Oman, *A History of the Art of War in the Sixteenth Century*, 581, 594.

²⁷ Fuller, *The Decisive Battles of the Western World, Volume II*, 51.

²⁸ Regan, *The Guinness Book of Decisive Battles*, 107.

²⁹ Tilly-wounded three times in the fighting-had lost his reputation. His old-fashioned methods, of mass and weight and slow, statuesque maneuvers, had been shattered by the new mobile and flexible methods of a more modern commander. Regan, *The Guinness Book of Decisive Battles* 108.

³⁰ Eltis, *The Military Revolution in Sixteenth-Century Europe*, 51.

³¹ "Machiavelli, writing long years before the combat of Marciano, had recommended that a general should try to retain his liberty of movement, by keeping far enough off from the enemy to allow himself time to move at leisure. It was the want of such elbow-room which had ruined the Spaniards at Ravenna. But this, of course, was by no means always possible. We do detect, however, many cases, like those quoted above, where the adversaries were so resolved not to give the enemy a chance, or to be forced into a battle at a disadvantage, that they behaved with what looks like excessive caution." Oman goes on to say that the primary reasons for these indecisive battles was the preponderance of mercenary forces, and their inherent limitations in numbers, discipline and morale, and the great difficulties in supplying offensive campaigns. Sir Charles Oman, *A History of the Art of War in the Sixteenth Century*, 219-220.

³² Michael Mazarr, *The Revolution in Military Affairs: A Framework For Defense Planning*, (Strategic Studies Institute, U.S. Army War College 1994), 2.

³³ Population.com, (accessed 30 November 2000) available from <http://www.population.com>; Internet.

³⁴ "Ethno-national conflicts, ecological threats, and demographic catastrophes [mass internal migrations, famine, epidemics, and the flight of refugees affecting entire states and regions] and large-scale social pathologies with transnational dimensions [narco-trafficking, organized crime as a social movement, and terrorism] form the new matrix of threats in an unstable world. Jacob W. Kipp, *The Russian Military and the Revolution in Military Affairs: A Case of the Oracle of Delphi or Cassandra?*, (Strategic Studies Institute, U.S. Army War College 1995), 4.

³⁵ "What are some of the new trends in the American economy that could bear on the Army's participation in a revolution in military affairs? One of the most striking features is the increase in efficiency arising from the appearance of tens of thousands of smaller firms, compared to the Fortune 500, which are the incubators of technological innovation. A tendency to think of the familiar giant corporate names as the engines of the U.S. economy remains, but this view is a decade out of date. The computer revolution has produced a wholesale restructuring of industrial organization, whereby smaller firms have been able to capture economies of scope as well as flexible economies of scale." In a related trend the main arena of technical innovation has shifted to the commercial from the government sector." Paul Bracken and Raoul Henri Alcala, *Wither the RMA: Two Perspectives on Tomorrow's Army*, (Strategic Studies Institute, U.S. Army War College 1994), 5-6.

³⁶ "A powerful combination of social, technological, and political developments is revising the role of military force in national policy and changing the way wars are fought. In responding to this dizzying pace of change, our challenge is to seize the opportunities of this new era in warfare, to make it work for us rather than against us." Michael J. Mazarr, *The Revolution in Military Affairs: A Framework for Defense Planning*, 2.

³⁷ "Under the new operational paradigm battles were fought to retain or deny freedom of action. Battles are seldom fought for the simple destruction of the enemy's forces." James J. Schneider, "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art", Theoretical Paper NO. 4, (Fort Leavenworth: SAMS, 16 June 1991), 34.

³⁸ "The move away from an era of total war will limit both means and ends. These limitations may once again raise the traditional distinction between enemy forces on the battlefield and the civil/industrial base." Jeffrey R Cooper, *Another View of the Revolution in Military Affairs*, (Strategic Studies Institute, U.S. Army War College 1994), 18.

³⁹ "Today when we speak of annihilation we no longer mean in the Napoleonic sense the destruction of the enemy's army, we mean the destruction of the entire enemy's capacity to wage war: that is, destruction throughout the strategic depths of the enemy". James J. Schneider, "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art", Theoretical Paper NO. 4, (Fort Leavenworth: SAMS, 16 June 1991), 67.

⁴⁰ John J. Patrick, "Reflections on the Revolution in Military Affairs", (Project on Defense Alternatives: <http://www.comw.org/ma/fulltext/reflect.html>), 3, Internet.

⁴¹ The operational art implies that war will remain protracted. "If a nation was to sustain a protracted war of any duration, it would have to defend--and seize--the resource and production base." James J. Schneider, "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art", Theoretical Paper NO. 4, (Fort Leavenworth: SAMS, 16 June 1991), 63.

⁴² "To these analysts, the Gulf War provided a vision of a potential revolution in military affairs (RMA) in which "Information Age" technology would be combined with appropriate doctrine and training to allow a small but very advanced U.S. military to protect national interests with unprecedented efficiency." Steven Metz and James Kievit, *Strategy and the Revolution in Military Affairs: From Theory to Policy*, (Strategic Studies Institute, U.S. Army War College 1995). iii.

⁴³ Drew Middleton, *Crossroads of Modern Warfare*, (Garden City: Doubleday & Company, INC., 1983), 266.

⁴⁴ "The classical tradition of a strategy of a single point became extended in breadth and depth through space and time under the new style of operational art." James J. Schneider, "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art", Theoretical Paper NO. 4, (Fort Leavenworth: SAMS, 16 June 1991), 34.

⁴⁵ The operational level of war is the level at which campaigns and major operations are planned, conducted and sustained to accomplish strategic objectives within theaters or areas of operations. A campaign is a related series of military operations aimed at accomplishing a strategic or operational objective within a given time and space. A major operation is a series of tactical actions (battles, engagements, strikes) conducted by various combat forces of a single or several services, coordinated in time and place, to accomplish operational, and sometimes strategic objectives in an operational area. FM 3-0 Operations, DRAG Edition, (Headquarters Department of the Army: 15 June 2000), 2-3.

⁴⁶ "Battles, because they were less efficient would become less decisive. The decline of the decisive battle in turn would lead to long protracted wars of exhaustion and place a whole new emphasis on the economic aspects of war." James J. Schneider, "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art", Theoretical Paper NO. 4, (Fort Leavenworth: SAMS, 16 June 1991), 5.

⁴⁷ "The emerging RMA in mid- or high-intensity warfare is centered around the fusion of sophisticated remote sensing systems with extremely lethal, usually stand-off, precision-strike weapons systems and automation-assisted command, control, and communications.", Steven Metz and James Kievit, *The Revolution in Military Affairs and Conflict Short of War*, 5.

⁴⁸ David Jablonsky, *The Owl of Minerva Flies at Twilight: Doctrinal Change and Continuity and the Revolution in Military Affairs*, (Strategic Studies Institute, U.S. Army War College 1994), 8.

⁴⁹ General Mi Zhenyu, *China's National Defense Development Concepts*, in *Chinese Views of Future Warfare*, (National Defense University Press, Washington, DC, 1996), 381.

⁵⁰ General Mi Zhenyu, *China's National Defense Development Concepts*, in *Chinese Views of Future Warfare*, (National Defense University Press, Washington, DC, 1996), 365-366

⁵¹ Ch'en Huan, *The Third Military Revolution*, in *Chinese Views of Future Warfare*, (National Defense University Press, Washington, DC, 1996), 389.

⁵² David R. Beachley, Daniels C. Beck and Ioulia V Trousova, *Global Perspectives on the Revolution in Military Affairs: Selected Russian Views on the Changing Nature of Conflict* (Science Applications International Corporation, 1997), iii.

⁵³ IBID, 25-33.

⁵⁴ The first is based on stand-off platforms, stealth, precision, information dominance, improved communications, computers, global positioning systems, digitization, "smart" weapons systems, jointness, and use of ad hoc coalitions. The second may be based on robotics, nonlethality, psycho-technology, cyberdefense, nanotechnology, Steven Metz and James Kievit, *Strategy and the Revolution in Military Affairs: From Theory to Policy*, (Strategic Studies Institute, U.S. Army War College 1995), vi.

⁵⁵ Martin Van Creveld, *Technology and War*, (Toronto: The Free Press, 1989), 311.

⁵⁶ "But the number of those nations that can participate in the MTR in a limited way is much larger and the list is growing. Today some 20 nations can produce precision-guided munitions. That number may well double within a decade. And the pace of technological evolution is likely to increase, with the possibility of a dramatic breakthrough on the part of someone other than ourselves." Earl H. Tilford JR, *The Revolution in Military Affairs: Prospects and Cautions*, (Strategic Studies Institute, U.S. Army War College 1995), 16.

⁵⁷ David Jablonsky, *The Owl of Minerva Flies at Twilight: Doctrinal Change and Continuity and the Revolution in Military Affairs*, (Strategic Studies Institute, U.S. Army War College 1994), 7.

⁵⁸ "Recent discussions in the literature have begun to explore the tenets of military doctrine, strategy and various aspects of operational art, clearly indicating official efforts to translate theoretical examinations of future warfare into practical applications." David R. Beachley, Daniels C. Beck and Ioulia V Trousova, *Global Perspectives on the Revolution in Military Affairs: Selected Russian Views on the Changing Nature of Conflict*, 2.

⁵⁹ "China's military, which has always had advanced Marxist and Maoist warfare theory, absolutely must not fall behind the times. We must use a practical combination of information warfare and Marxist and Maoist military thought to guide information warfare and issues in military construction. "Major General Wang Pufeng, *The Challenge of Information Warfare*, in *Chinese Views of Future Warfare*, (National Defense University Press, Washington, DC, 1996), 319.

⁶⁰ "The unrelenting pace of technological innovation, fundamental shifts in the subject and organization of production, the vast recasting of institutions, and rapid shifts in social values raise the prospect of a self-organizing, adaptive society in a state becoming, making the current era truly revolutionary. Military institutions must adapt to this challenge within their own societies and prepare for the emergence of new and potential conflicts within and among states and non-states." Jacob W. Kipp, *The Russian Military and the Revolution in Military Affairs: A Case of the Oracle of Delphi or Cassandra?*, 4.

⁶¹ Statement of General Shinseki to the 106th Congress, 10 Feb 2000, <http://www.house.gov/hasc/testimony/106thcongress/00-02-10shinseki.htm>, Internet.

⁶² IBID.

⁶³ Statement of General Shinseki to the 106th Congress, 10 Feb 2000. Lt. Gen. Theodore G Stroup Jr., "The Ongoing Army Transformation", in *Army Magazine* (July 2000), page 8.

⁶⁴ Statement of General Shinseki to the 106th Congress, 10 Feb 2000. Lt. Gen. Theodore G Stroup Jr., "The Ongoing Army Transformation", in *Army Magazine* (July 2000), page 8-10, DRAFT TRADOC PAM 525-5.

⁶⁵ DRAFT TRADOC PAM 525-5.

⁶⁶ "A few years ago, the strategic challenge facing the United States seemed to be handling isolated regional tensions while guiding the world as it progressed toward stability and greater integration. Since then, key trends indicate the world is becoming murkier and more dangerous. Institute for National Strategic Studies, "Strategic Assessment 1999", (National Defense University: 1999), xi.

⁶⁷ "Another issue that must be addressed more effectively is the overextension of our Armed Forces. The cumulative effect of the numerous small-scale contingency operations and accompanying high operational tempo on our military personnel has adversely effected retention and recruiting." The Institute for Foreign Policy Analysis, Inc. and the Fletcher School of Law and Diplomacy, "Final Report on Strategic Responsiveness", (Tufts University: April 2000), 13.

⁶⁸ Statement of General Shinseki to the 106th Congress, 10 Feb 2000.

⁶⁹ "In Germany, despite economic chaos and the restrictions imposed by the Versailles Treaty, by 1935 the theoretical and operational foundations for blitzkrieg had been established. Furthermore, as the German experience indicates, frequently the RMA is not a matter of some revolutionary technological breakthrough, but the development of doctrines and organizations that can integrate existing technologies in a new and innovative way." Earl H. Tilford JR, *The Revolution in Military Affairs: Prospects and Cautions*, 12.

⁷⁰ "Currently, the primary advances of the RMA are in integrated, stand-off strike systems-the ability to find and destroy or disable targets by synchronized strike forces. Such capabilities form the heart of conventional, combined-arms warfare, but play only a very limited role in conflict short of war, but will have less impact in conflict short of war, which is most often won or lost through the manipulation of images, beliefs, attitudes and perceptions." Steven Metz and James Kievit, *The Revolution in Military Affairs and Conflict Short of War*, 31.

⁷¹ DRAFT TRADOC PAM 525-5

⁷² "Like past revolutions in military affairs, the present one is an organic whole. Any one element pursued in isolation will offer only a shadow of the RMA's true potential." Michael J. Mazarr, *The Revolution in Military Affairs: A Framework for Defense Planning*, 27.

⁷³ "As the services move into the Tofflerian Third Wave as Information Age Militaries, they are preparing to fight other Information Age, Third Wave armed forces. Just as it was necessary for the Air Force, Army, Navy and Marines to be prepared to fight their Soviet counterparts during the Cold War, it may be just as prudent to prepare for the most potent possible future threat. But will being able to fight in the Third Wave also ensure that the armed forces will be able to fight effectively against First and Second Wave foes? Historically, the record has not been good." Earl H. Tilford JR, *The Revolution in Military Affairs: Prospects and Cautions*, 14..

⁷⁴ Asian countries are now looking outward and no longer inward, and there are regional threats that are capable of mastering modern, technologically advanced warfare to quickly overpower their adversaries and win regional hegemony. These threats could present problems to the U.S. and will undoubtedly concern an evolution of strategic thought and doctrinal employment that will be very different from what we in the U.S. think of as feasible. Wither the RMA: Two Perspectives on Tomorrow's Army, pages 10-12.

⁷⁵ "The actual weapons used by Force XXI: the tanks, infantry fighting vehicles, artillery pieces, rocket launchers, helicopters, command and control vans, and support vehicles will look a lot like the Industrial Age weapons of today." Earl H. Tilford JR, *The Revolution in Military Affairs: Prospects and Cautions*, 5.

⁷⁶ "The harder the United States seeks to retain its primacy, the greater the incentive for other states to seek to become great powers. And the longer the United States acts as a hegemon, the more it weakens itself in relative power to the emerging great powers as the cost of sustaining preeminence begins to chip away at its economic strength and hence its economic and military capabilities." David Jablonsky, *Times Cycle and*

National Military Strategy: The Case for Continuity in a Time of Change, (Strategic Studies Institute, U.S. Army War College 1995), 12.

⁷⁷ "From the military and technological perspective, the lessons are clear. Advances in technology have yielded important military advantages from the earliest times." Sir Michael Howard and John F. Guilmartin JR, *Two Historians in Technology and War*, (Strategic Studies Institute, U.S. Army War College 1995), 14.

⁷⁸ "Technology is extremely seductive and it is easy to get caught up in the exotic potential of the RMA. But in pursuit of a new way of making war, one cannot allow technological romanticism to engender visions of a mystical silver bullet which promises to sanitize war by erasing its human dimensions." Earl H. Tilford JR, *The Revolution in Military Affairs: Prospects and Cautions*, 10.

⁷⁹ "The belief that the United States will be able to maintain a decisive advantage in tomorrow's military technology is the most obvious flaw in conventional thinking about the RMA. In modern times, no technological leap has decided the outcome of a major war or given one country more than a fleeting military advantage over other leading industrial powers." John J. Patrick, "Reflections on the Revolution in Military Affairs", 4.

⁸⁰ "The Process of Revolution. Successful military innovation is a process that involves far more than just conceiving or developing new technologies and operational concepts. Not only must the new capabilities be physically developed and their superiority demonstrated, but successful implementation of these innovations requires that they be integrated into the military force structure and operational concepts. Adoption of innovation demands more than just the ability to equip a force or military service with innovative weapons. Organizations, operational patterns, and decision processes must also be modified to implement the innovation as an integral element of the service's ethos." Jeffrey Cooper, *Another View of the Revolution in Military Affairs*, 22-23.

⁸¹ To successfully pursue an exploitation of the current RMA the Army must understand the process of an RMA, quantify strategic objectives and benefits for the RMA, specify the technical and operational content of the RMA, identify its potential military utility on the battlefield, understand the means for its employment, and identify the potential organizational and structural implications and consequences. Jeffrey Cooper, *Another View of the Revolution in Military Affairs*, vi.

⁸² "The RMA is at a crossroads. In the broadest sense, there are three options: push along the road of precision, stand-off strikes and disruptive information warfare aimed primarily at conventionally-armed regional aggressors; put a brake on the RMA and stand pat in order to consolidate existing advantages; or push the revolution in a different direction." Steven Metz and James Kievit, *Strategy and the Revolution in Military Affairs: From Theory to Policy*, viii.

⁸³ "The Army can partly construct its future, but it also must accept certain features of its external environment.", Paul Bracken and Raoul Henri Alcala, *Wither the RMA: Two Perspectives on Tomorrow's Army*, 2.

⁸⁴ "Sophisticated observers recognize the complexity of an RMA-that it is more than just clever new technology. They identify four component elements: operational innovation, organization adaptation, evolving military systems, as well as emerging technologies.", Jeffrey R Cooper, *Another view of the Revolution in Military Affairs*, 19.

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